TECHNOLOGY DEPT.

# The Chemical Age

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A Weekly Journal Devoted to Industrial and Engineering Chemistry

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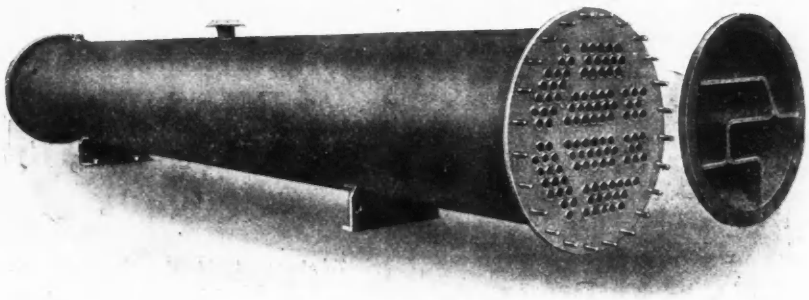

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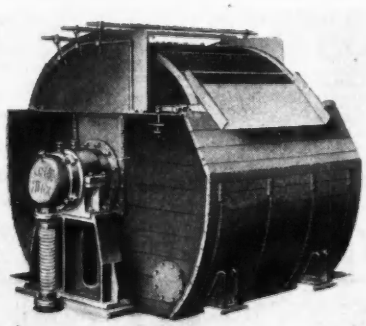

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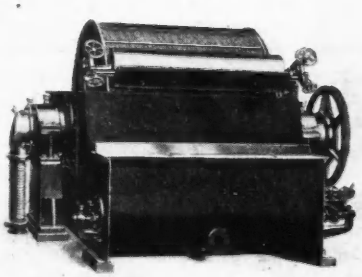

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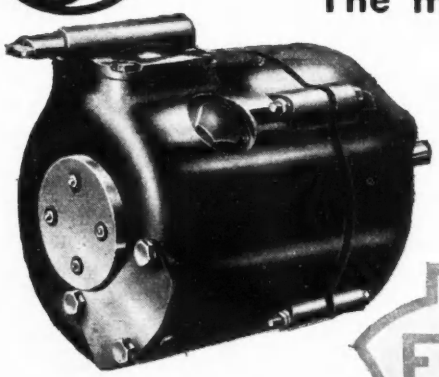

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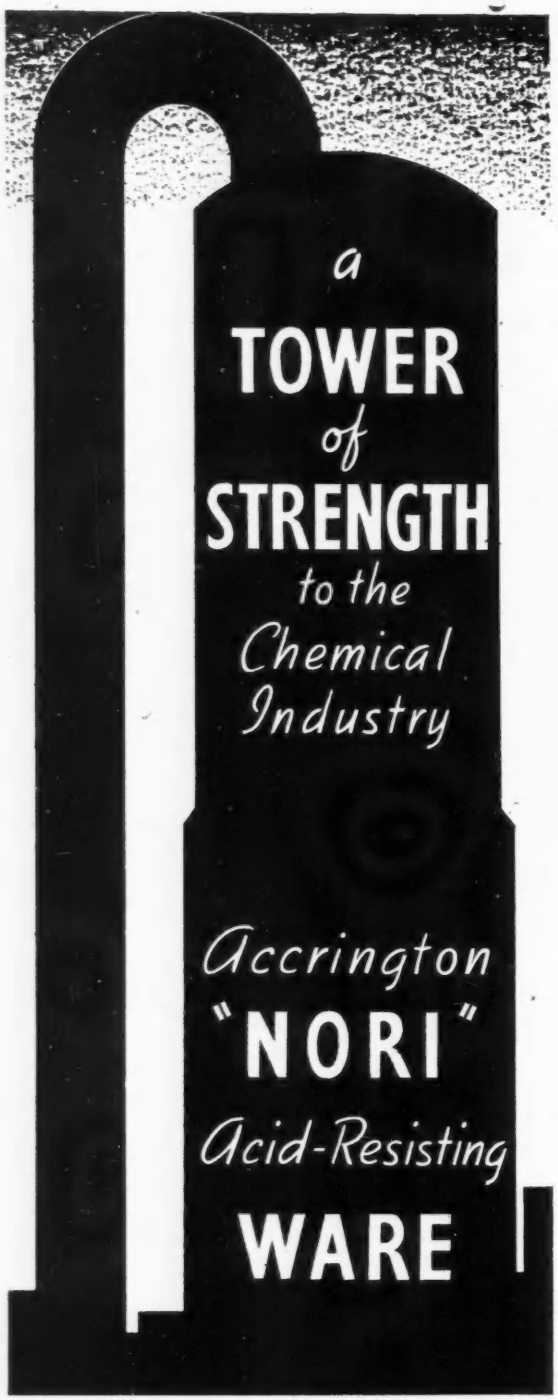


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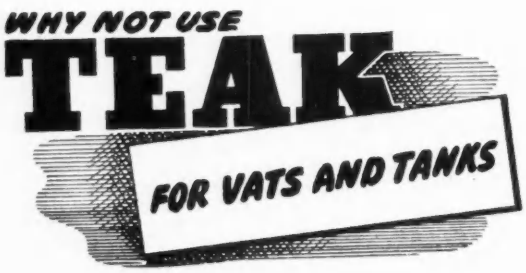


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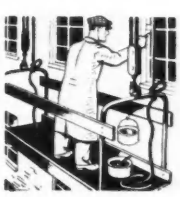

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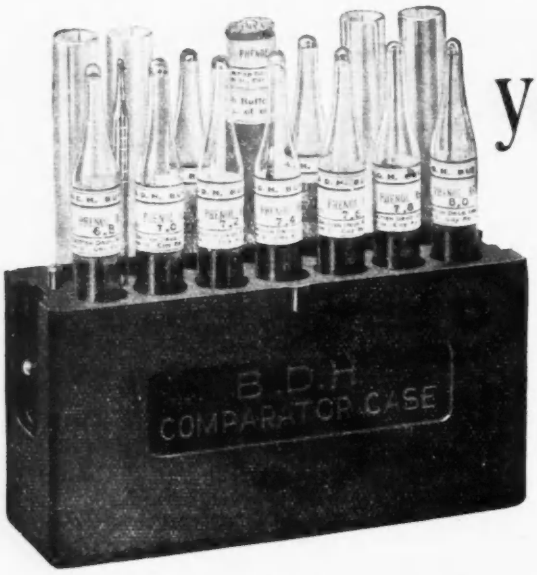


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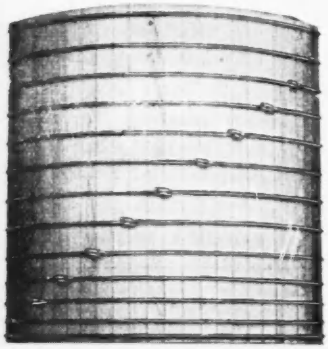

*Further note*—Since the war began we have so far fully maintained our pre-war high standards as to quality and seasoning of timber, and it is our intention to continue thus. If however, circumstances should at any time compel otherwise, any quotation affected would contain an appropriate notification.

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# The Chemical Age

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VOL. XLVI. No. 1182 February 21, 1942 Annual Subscription, 21s. Overseas, 26s.

# Recruitment of Industrial Chemistry

THE position of chemists is causing some anxiety among those who think forward into the future and who value the status of the profession. "Status" is a relative term; it is meaningless if divorced from the purpose of chemistry. In industrial chemistry it must be recognised that the chemist exists for the purpose of doing a specific work. That work may be routine analysis, it may be advanced analysis of a non-routine type, it may be the control of industrial processes, or it may be research work—but whatever it is the purpose of the chemist must be to fulfil the duties reasonably expected of him by his employer. The remuneration paid to a chemist must be correlated with the duties he performs: it would be uneconomic, for example, to employ a dozen chemists at, say, £600 a year each to carry out routine analyses of an elementary type. The status of a chemist, therefore, depends upon what work he is able to do and upon his ability to persuade an employer to allow him to do that work. Basically, in fact, status depends upon education.

That conditions are to-day steadily drifting towards a state of chaos which may cause incalculable and lasting harm to the profession is the opinion of many. Dr. E. A. Rudge, for example, pointed out in a recent paper that industry is dissatisfied with the product of the modern educational system and university-trained chemists seem not to be favoured in industry to the extent that many would expect. An investigation quoted by Dr. Rudge, made in East London a few years ago, indicated that existing employees include not more than 27 per cent. recruited as graduates and 63 per cent. recruited as undergraduates. More recent recruitment figures based on Dr. Rudge's own observation indicate that to-day the recruitment of undergraduates has reached some 85 per cent. of the total. On the basis of these and other facts, Dr. Rudge has put forward the view that there should be systematic schemes of vocational guidance and training to ensure a supply of the best youthful brains of the country; with these methods of recruitment, conditions of service and scales of remuneration must be stabilised upon a national basis; finally, industry and education must co-operate in planning a profession of chemistry based on standards demanded by modern conditions. It would appear that Dr. Rudge is in favour of vocational selection based on the methods of industrial psychology followed by a system of part-time education for those who do not attend whole-time courses at the universities.

Whether universities have developed the best methods of training industrial chemists is a subject on which there can be almost unending argument. The fact remains that for one reason or another the majority of chemists do not pass through a university other than as part-time—usually evening—students. One reason no doubt is that the great majority of industrial chemists are engaged upon routine work for which it would not be economic to pay the salary demanded by a university graduate. Boys who are recruited for this purpose do not require more than a clerk's wages, and often less. Recruitment is thus very largely a matter of economics. It must be remembered, however, that the young people who are thus put into a laboratory almost by accident are usually among the more intelligent products of the schools and are generally ambitious. On the chief chemist and the other senior chemists there is, or should be, an obligation to advise and encourage the younger undergraduate chemists on their staffs in order that they may at a later date advance in status.

Education should thus start farther back than in the works or universities. As Dr. Rudge has expressed it, "Industry requires a supply of the best youthful brains of the country." Brain power exceeding the level of average common sense is not any too plentiful, and every endeavour should be made to see that the youth of the country, whatever may have been the poverty or wealth of their upbringing, should have the opportunity to enter a branch of industry in which considerable promotion is possible, if the intelligence to deserve it is there. Although education up to the matriculation standard is generally left to schoolmasters, it is thus in reality a subject of the greatest importance to industry. The most important and the most expensive raw material of industry is brains.

In raising the general standard of education care must be taken not to make men dissatisfied with manual work. A complaint was recently re-published in the daily papers to the effect that labourers, both men and women, were becoming scarce; and the writer added: "I will fearlessly assert that this is due to the extensive system of education pursued in our parochial and national schools." It is true that this letter was written in the year 1842, but we hear echoes of the same complaint to-day. The increasing mechanisation of industry, however, makes it evident that the standard of education of the artisan must be increased just as the standard of education of the staff and management has been advanced. Education and the demands made by industry on the intelligence of the workmen must advance at parallel rates if we are to avoid an unbalanced society in which everyone wants a "black-coated" job, and no one will do manual work.

# NOTES AND COMMENTS

## Scorched Earth

PERHAPS the most cogent comment on the insanity of war as a political instrument in the creation of the deliberate policy of defensive destruction known as the "scorched earth" plan. By this means the resources of nature harnessed by civilisation are denied to a temporarily successful aggressor; they are likewise denied to the whole of posterity until the damaged works can be rebuilt. The Russians set the pace by blowing up the Dnieper dam; now the Dutch, with logical determination, are pursuing the policy in the East Indies by destroying the valuable oil installations and other works that they have constructed by years of labour. Indeed, the value of some of the work borders on the astronomical; £18 million is the figure reckoned by a special correspondent of *The Times* for the property at Balik Papan; the worth of the Palembang installations has not yet been assessed; and to these must be added the destruction to tin and rubber believed to have been wrought in Malaya. The immediate good effect, of course, is the deprivation of Japan of all the resources of tin, oil, and rubber that she hoped to acquire by brigandage; and strategically that is excellent, especially as the Japanese have not the resources to repair the damage while carrying on a major war. The Japanese must, indeed, have been mad to enter the war when they did, as Mr. Churchill indicated in his last speech. The greatest tragedy is, however, that we and our Allies are thereby forced to go mad also, and wreck the works of civilisation that we have brought to the lands that are now in the front line. Meanwhile, chemists and engineers are straining every nerve to find new alternatives and build new factories to replace the lost resources; they are the torchbearers of civilisation to-day, and their burden will not be lessened until many years after the war is ended. Theirs will then be the honourable task of healing the scars of civilisation.

## The Work of the Imperial Institute

QUERIES concerning almost every imaginable natural product, animal, vegetable, or mineral, must have been answered at one time or another by the members of the Advisory Councils of the Imperial Institute; and the Annual Report of the Institute, published last week, shows no falling off in either the scope or the number of the problems dealt with. In time of war, naturally, the Institute comes especially into its own, for we are thrown back mainly on our resources and those of our friends, and substitutes for foreign supplies have to be found. There is, however, no tendency to fob inquirers off with an inferior article, just because it happens to be of Imperial derivation. One firm of light alloy makers, for instance, sought supplies of zirconium ore for the development of a new alloy; they were duly advised of the Brazilian suppliers of ore of high zirconium oxide content, but at the same time their attention was directed to other supplies in India and Australia from which material zirconium oxide was already being commercially made by a chemical process. In another instance a firm had been importing, from a source no longer accessible, a special quality of silica sand. They were informed of domestic sources of material which ultimately proved to be quite as good as the foreign sand formerly used. Again, at the request of the rubber and paint industries, inquiries were instituted for a substitute for asbestine, a talc-and-tremolite powder formerly drawn from American sources, and now in short supply. After careful investigation it was concluded that the most likely raw material was a rock known to occur in South Africa. Samples were obtained, ground, and submitted; the tests were encouraging, and a leading paint-manufacturer has expressed the desire to use the material when it becomes commercially available. So the Institute lubricates the wheels of industry with its valuable and scientific advice; and the great British war machine moves on the more smoothly by reason of the multifarious work of the scientists at South Kensington.

## Chemical Reorganisation in S.E. Europe

POST-WAR industrial and economic planning based on the assumption of an Axis victory is just as much a preoccupation in Germany as that depending on an opposite assumption is prevalent here. Some indication of the scope of the planned reorganisation of the "new Europe," at least from the standpoint of the chemical industry, is given by a special correspondent writing in a recent issue of *Chemical and Metallurgical Engineering*. The major rearrangement is taking place in south-eastern Europe, where a swing-over of financial interests from the Slavs and the French to the Germans (and possibly the Hungarians) is in full course. It is claimed that the Zivno Bank of Prague favoured Czech development almost exclusively, while the Yugoslav Bank sacrificed Croatian to Serbian interests in Croatia. At all events, the position is now changed. In "independent" Croatia an office for industrial reorganisation has been set up, and majority ownership in the Croat Land Bank (successor to the Yugoslav Bank), which recently doubled its capital, was transferred from the Zivno Bank to the Dresdner Bank, which through its subsidiary Bohemian Union Bank of Prague has already acquired a large part of the shares from the Union Européenne Industrielle et Financière of Paris. This concern controlled the Schneider-Creusot interests in coal mines and iron works in Poland and Czechoslovakia. The French shares of the Skoda works at Pilsen, which produces chemicals, coal, and other manufactures in addition to armaments, have been bought by a German company on account of the Hermann Goering concern, according to reports.

## The Yugoslav Chemical Industry To-day

MUCH of the former Yugoslav chemical industry is located in the Croatian area, although some is found in parts of Yugoslavia now occupied by Hungary and Bulgaria. A well-established firm now located in Croatia is the Yugoslav Solvay, which manufactures sodium bicarbonate, sodium hydroxide, and ammonia. The German Dynamit Nobel concern has taken over the Bosnian Electric works. I. G. Farbenindustrie is represented on this company's board of directors by two members of the A. G. Dynamit Nobel, Bratislava (Pressburg), an I. G. subsidiary. Bosnian Electric is developing water power, and manufactures calcium carbide, chrome products, and ferro-silicon. The Pressburg company has also resumed superphosphate and sulphuric acid production in the Kostolany works in Hungary, which had been shut down for some time. A wood distillation plant, formerly owned by the Yugoslav state, is also located in the Croatian area. The partly Swedish-owned United Yugoslav Acetylene and Oxygen works, manufacturing technical gases and nitrates at Ruse, near Maribor (Slovenia), is another important firm. The Chromos Company, developing Dalmatian hydro-electric power, has been acquired from the French. Some of the capacity of Stickstoff Werke A.G., Ruse,—it was the Austrian Stickstoff Werke until 1921—is located in Lower Styria, a Slovenian region taken from Yugoslavia and incorporated into the Austrian part of the Reich. The area produces coal, lignite, lead and zinc, and wood. The Stickstoff Werke production programme includes calcium carbide, calcium nitrate, urea, fertilisers, ferro-silicon, ferro-chrome, technical gases, and artificial abrasives. Another important chemical firm in Slovenia is the Fabrik Chemischer Produkte at Hrastnik and Celje, producing sulphuric and hydrochloric acids, sodium and magnesium sulphates, superphosphates, opium, and other pharmaceuticals.

## Safety Guards Speed Up Production

MACHINE guards properly designed and erected increase output by reason of the greater confidence felt by the operators. In one press shop, several power presses used for stamping sheet metal products have increased their production by 20 to 30 per cent. since the design was improved.

COLLECTED NOTES ON CHEMICAL SAFETY

# Explosion in Crushing and Screening Operations

By JOHN CREEVEY

THE widely used mechanical operations for reducing solids to powder form, and for subsequently screening the product, are rather more hazardous from the explosion aspect than would at first sight seem probable. Apart from the fact that all dispersions of dust in air are dangerous if the dust is of a combustible material, there are other factors which may arise by nature of the physical or chemical character of the material under treatment. Conditions, indeed, are so diverse that more is likely to be learned from the consideration of a number of individual occurrences than from a general article upon this particular subject.

*Chlorates: Intensified Friction.*

Chlorates are always dangerous under intensified friction, especially potassium chlorate; the hazard is mainly that of bursting into flame, with explosive violence. Presence of grit and certain other chemical matter increases the danger. The initial cause of an explosion in chlorate crushing, however, is not always friction; it can arise from unexpected quarters. For instance, the material has been known to "pack" into a solid mass between the upper and lower stones of a mill (*Ann. Rep. Insp. Factories,* 1920), when friction did not become effective at danger point until the unequal balance threw the upper stone from its pivot, and the impact that followed caused detonation of the batch of chlorate in the mill. One person was killed.

*Azo Dyestuffs: Sparks from Rock-hard Press-cake.*

The tendency for azo dyestuffs to explode predominates when impurity is present, chiefly in the form of undecomposed diazo-compound; the explosion usually follows a spark. Some hard spark-producing material may reach the interior of the plant unobserved, and in a disintegrator it would be struck by the revolving rotors. At one plant (*Ann. Rep. Insp. Factories,* 1923) the dyestuff cake was fed to the disintegrator from the floor above by a chute, which facilitated the entry of foreign matter. The flames from the explosion travelled up the chute and the man attending to the feed received fatal burns. As regards the pulverising of organic colours generally, it has been recommended that the plant be housed in a separate building, with machines fed automatically from hoppers, the electric motor being of an approved safety pattern, or placed in a separate part of the building, and that doors are interlocked with the motor starter. Danger from foreign matter entering the hoppers and passing on to the machines, however, must be countered by strict supervision, and it must be further noted that some organic colours have a tendency to form rock-hard press-cake which can be spark-producing in contact with the steel parts of a disintegrator or crusher. Such material must be handled with special caution, and if necessary reduced to powder in porcelain-lined ball mills by the aid of pebbles as pulverising medium.

*Nitrate Press-Cake: Danger from Grit.*

An explosion, which took place while potassium nitrate in the form of press-cake was being broken down to powder for use in the making of fuse, seems to have been caused by a spark due to the presence of grit, athough the nitrate is said to have been high-grade (*Insp. Expl. Rep.,* 1921, Accident 215); a spark from the adjacent boiler-house chimney was also a possible yet improbable cause, since the chimney was provided with a spark arrester. If grit was the culprit, and could get into an operation where high-grade potassium nitrate was being handled under the strict safety rules enforced at an explosives works, how much more likely it is that grit may be a source of danger in operations at chemical works generally if essential precautions are neglected?

*Prussian Blue: Inflammability in Blending.*

Prussian blue is liable to cause a fire when being crushed and blended with chrome yellow for the production of chrome green; the operation is especially hazardous in the commonly used edge-runner mill. Chrome green is usually made by precipitating the two colours together, but it is often still necessary to make adjustments of shade to some standard by dry blending in the manner stated. Pure Prussian blue ignites at 234° C.; the ignition point is lower when impure, *e.g.,* where ferrous sulphate is present. A mixture of 80 per cent. chrome yellow and 20 per cent. Prussian blue of technical quality will decompose explosively at 238° C., but with the chrome yellow increased to 92 per cent. the mixture burns slowly at 270° C. Using 96 per cent. chrome yellow and 4 per cent. Prussian blue, the mixture does not burn even at 280° C., although alone Prussian blue is completely decomposed at this temperature (*C.T.J.,* 1923, *73,* 552). The addition of a small amount of petroleum jelly has pronounced effect in reducing the inflammability; by the addition of 2 per cent. petroleum jelly, chrome green, which ignited under friction at 238° C., had its ignition point raised to 246°. The admixture of small amounts of inert or otherwise harmless matter to reduce the fire hazard where it exists in dry blending is worthy of more attention than it has yet received.

*Aluminium "Bronze Powder": Air-Dust Mixtures.*

The screening of aluminium in finely divided condition for use as a bronzing powder creates a highly dangerous atmosphere inside the machine. This air-dust mixture is likely to be ignited by a spark caused by foreign material, even when copper gauze is used as the screening medium; it may also be ignited by a spark from a static charge set up in the metal parts of the machine by friction of driving belts and pulleys (*Ann. Rep. Insp. Factories,* 1921). Aluminium in powder form is but one among many materials in a finely-divided form which, if combustible, are hazardous for the same reason, and from the same sources of spark, against which precautions must be taken.

*Naphthalene: Ineffective Magnetic Separation.*

After an explosion in a disintegrator engaged in breaking down naphthalene, fragments of metallic matter were found in the uncrushed naphthalene waiting to be fed to the machine (*Ann. Rep. Insp. Factories,* 1923). Two persons were injured. Prior to crushing; all the naphthalene was passed through a magnetic separator to remove possible metal, but the separator in this instance was insufficiently powerful to remove metal which had acquired a temporary non-magnetic coat by contact with the naphthalene. Unsatisfactory magnetic separation has been noted in connection with the crushing of sulphur, and a system of hand sieving has often been adopted in breaking up pieces of the material in which there is suspicion of metal or dangerous spark-producing foreign matter.

*General Maintenance of Plant.*

Good maintenance of all plant and machinery at chemical works has many times been wisely pointed out as a means for reducing accidents; the truth applies even in the case of accessory causes for explosions. An explosion in an elevator at a sulphur crushing and screening plant was attributed to the ignition of sulphur dust by a spark from one of the buckets which struck the elevator casing.

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**Switzerland's chemical export trade** is meeting with increasing difficulties, but some compensation has been derived from larger sales in the home market, consequent on lack of imports. The coal-tar dyestuffs industry has suffered from a shortage of raw materials, but progress has been made in the development of a domestic raw material basis, so that the output of intermediates seems to have increased. The lack of copper, chromium, and potash compounds has caused inconvenience, and state control has become necessary for many of these articles.

# Potash from Sea Water*

## A Summary of the Processes in Commercial Use

THE great potash resources that in the past have supplied the world's requirements are the bedded deposits of Germany, France, Poland, Spain, Russia, and, more recently, the United States. Not much of the potash of Europe moves very far from its base of supply now that the countries are embroiled in war. Scientists of several countries in which no potash is found have experimented from time to time on methods of extracting it from sea water in commercial quantities. These attempts have been made, not so much because there is such a relatively large quantity to be had from sea water (only 5 parts of $K_2O$ equivalent in 10,000 of sea water), but because there is so much sea water available. Bromine is found in sea water in even smaller quantity (less than 1 part in 10,000), yet a method has been devised to extract it commercially.

Previous to the development of the bedded potash deposits and the recovery of potash salts from the brines of lakes and marshes in the western United States, it was thought by some operators that potash might be recovered profitably from the bitterns of the solar-salt plants on the Pacific Coast that use sea water, but no commercial undertaking resulted.

### Norwegian Process

Among the most recent of the developments is a Norwegian process that reached the pilot-plant stage in 1940. This process, patented by the Norsk Hydro Elektrisk Kvaelstof A/S, disclosed that dipicrylamine (hexanitrodiphenylamine) would act as a selective agent to extract the potash from the sea water, making a compound from which the potash could be recovered and the precipitant regenerated for re-use. It is understood that the patent specification (No. 22,025) describing the properties and uses of the precipitant for potash recovery became open to public inspection under the International Patents convention. Briefly, the method is as follows.

When a dipicrylaminate—whether calcium (preferably), sodium, lithium, or magnesium—is added to sea water, it immediately forms the water-insoluble potassium dipicrylaminate, and that precipitates while the other constituents remain in solution. After the solution is filtered off, the next step has the double purpose of obtaining the potassium and recovering the reagent from the remaining filter cake. For this the filter cake is treated with nitric, sulphuric, or hydrochloric acid, which dissolves out the potassium and forms a potassium salt of the acid used, leaving behind the dipicrylaminate crystals.

### Examples of Treatment

The specification describes the different steps and the best procedure and gives an example in which 420 g. of dipicrylamine was dissolved in 8 litres of milk of lime, with a calcium oxide content of 27 g. The solution was filtered and added to 100 l. of sea water containing about 73 g. of potassium chloride, while stirring, at 16 to 18° C. A red crystalline mass separated out, was filtered after 15 minutes, and washed with water. The filter cake, of which 78 per cent. was potassium dipicrylaminate, the balance being water, weighed 435 g. This filter cake was then treated, while stirring, at 20° C., with 270 cc. of 14 per cent. nitric acid for about three quarters of an hour. After filtration and washing, the quantity of potassium nitrate in the solution corresponded to a conversion of 93 per cent. of the nitric acid used, but with a systematic treatment of the salt with nitric acid, practically complete conversion can be obtained. To the original filtrate of 108 l., containing unconverted calcium dipicrylaminate, there was added such a quantity of 47 per cent. nitric acid that a *p*H of 3.6 was obtained. This caused precipitation of the excess dipicrylaminate.

Another example describes the application of the process to recover 5000 tons of $K_2O$ a year from sea water, according to which 1750 cu. m. of sea water containing 0.43 kg. of $K_2O$ per cu. m. are pumped per hour into a tank to which is added, per hour, 50 cu. m. of a solution of calcium dipicrylaminate containing 5.6 tons of dissolved dipicrylamine. Approximately 75 per cent. of the potash content is precipitated, corresponding to 0.57 ton $K_2O$ an hour.

### Japanese Process

A number of attempts have been made in Japan to obtain potassium salts of various kinds from sea water but details are not available at present. In 1932 a United States Trade Commissioner assigned to Tokyo reported that the Japan Iodine Co. had begun the manufacture of potassium chlorate, the production being then was reported to be 220 barrels of 50 kg. each per day, and it was expected that they would soon be able to produce 300 barrels per day. No later information regarding the progress of this method has so far been obtainable.

In 1936 it was reported that the Nippon Denki Kogyo K. K. (Japan Electrical Industrial Co.) had completed its plant at Yokohama to produce potassium hydroxide and chlorine products. It had a daily capacity of 28 metric tons of potassium hydroxide, and the production then was about 22 tons daily.

In the same year a Tokyo professor obtained a patent to utilise the bitterns from the manufacture of common salt from sea water to obtain potassium. The process was said to be one of treating the brines with aluminium sulphate to yield a commercial potassium sulphate, the aluminium sulphate being recovered for further use.

### Italian Process

Other processes have been designed to utilise the bitterns of the residue after extraction of sodium chloride from the sea water. The Niccoli method possibly is one of the most outstanding of such processes, and, it is understood, was operating successfully in 1939. The process was used first experimentally at Naples, and later on a commercial scale in the Italian colonies of Africa, in the hope of supplying Italy with its potash requirements, which that country has to import. Enrico Niccoli, who described his process in *Chimie et Industrie*, 1936 (*18*, pp. 557-563), said the installation was intended to deal with the whole of the mother liquors from the salt-extraction works, which could produce up to 100,000 metric tons of salt annually. This would mean a possible production of about 3000 tons of potash salts containing up to 50 per cent. potassium sulphate.

The process has three stages—two chief stages and one not absolutely necessary. First the bitterns at 30° Bé are concentrated by solar heat in in a series of pans up to 35° to 37° Bé, the impure sodium chloride deposited at a lower concentration being removed. At this density a mixed salt called mellahite is deposited. Because of changes in physical conditions such as wind and temperature, the composition of the deposited mellahite is not absolutely constant. However, it ranges about as follows: 18 to 21 per cent. potassium chloride, 17 to 22 per cent. sodium chloride, 29 to 33 per cent. magnesium sulphate, and 2 to 4 per cent. magnesium chloride. The composition has an effect on the purity of the final product.

Secondly, after the mellahite has been left heaped on the ground for several months, it is ground, weighed, and washed by sea water of suitable concentration and temperature to produce schœnite ($K_2SO_4.MgSO_4.6H_2O$). The wet schœnite is then centrifuged and the wash water driven off, resulting in a product containing about 38 per cent. potassium sulphate besides 1 per cent. potassium chloride and magnesium sulphate, and some sodium chloride. Passing to a dehydrator at a temperature of 170° C., the water of crystallisation is removed. The composition of the Niccoli potash salts produced is compared with that of the German potash fertiliser Kalimagnesia in the following table:

* From *The American Fertilizer*, 1942, *96*, 1, p. 8

| | Niccoli potash salts | Kalimagnesia |
|---|---|---|
| Potassium sulphate ... ... | 51.0 | 50.4 |
| Magnesium sulphate ... ... | 37.0 | 28.0 |
| Sodium chloride ... ... ... | 3.1 | 3.5 |
| Calcium sulphate ... ... ... | — | 3.4 |
| Water ... ... ... ... | 4.6 | 7.1 |
| Insoluble ... ... ... ... | 3.0 | 7.6 |

If the third stage is used, it intercepts the process before the schœnite goes to the dehydrator. The schœnite is dissolved in fresh (non-salty) water. Milk of lime is added to precipitate the magnesia, together with the calcium sulphate; the potassium sulphate remains in solution. By evaporation a product ranging up to 95 to 96 per cent. $K_2SO_4$ can be recovered from the solution. Where fresh water is not obtainable this stage is omitted.

In this process the degree of commercial success depends on climatic conditions, the most favourable places for its use being those with high temperatures and the right winds. Another advantage would be proper natural slopes, which would permit an inexpensive gravity system to be used.

# Checking Pollution of Rivers

## Methods of Overcoming Harmful Effluents

ONE of the black spots in the history of the chemical industry in the last war was its serious pollution of many important fishery water as well as the atmosphere of industrial towns. The same problems of river pollution have arisen in this war, but there is better knowledge of the control of river pollution that should result in the preserving of valuable fisheries. For example, the death of many salmon smolts during their spring migration to the sea in the river Tees was caused by cyanides from coke oven effluents, which can now be converted into the less toxic ferro-cyanide by treatment with spent pickle liquor and lime. The waste water from the milk manufacturing industry and from sugar beet factories can be used again after a treatment that does not entail a costly purifying plant. Plant with percolating filters will reduce the milk waste river pollution by 99 per cent. and the activated sludge process of treatment by 97 per cent.

Chemical manufactures, coal mines, lead works, the production of iron and munitions have always made a serious contribution to the pollution of river and offshore fisheries. A margin of sea off the Cumberland coast is almost barren of animal and vegetable life for many miles because of the alteration of the nature of the sea bottom resulting from the disintegration of slag produced in the local ironworks many years ago. Similarly, coal washings have destroyed the trout fishing in some Cumberland streams. The effluents from chemical works during the last war almost exterminated the salmon in the river Lune, and it was only by vigorous efforts in the subsequent years that it recovered its position as a small salmon river. Effluents from the chemical works at Widnes and Warrington nullified the Mersey as a source of salmon and sparling fisheries. When large quantities of T.N.T., amatol, and other explosive substances were "dumped" after the last war into the estuary of the Thames a highly destructive outbreak of disease occurred in the valuable oyster-beds there.

### The Chemist's Chance

Many seem to have accepted the view that the pollution of tidal rivers, foreshores, and coastal waters is the price which a manufacturing and maritime country, like Britain must pay for flourishing chemical industries. It has been said that we cannot have the latter without the former. But as the late Professor Johnstone, an eminent authority on fish-life and the sea, pointed out, the chemist has the best chances of solving the problem of pollution by a more economic exploitation of his waste products. A wider use of domestic sewage as fertilisers (and for fattening oysters and mussels for food on the Conway system) and of the waste products of the food-canning industry, would solve much of the trouble in river pollution. The river Ribble in recent years has been saved from a serious pollution threat and once more turned into a valuable salmon river by a vigilant and active fishery board.

The wastes of the canning industry are usually highly noxious, and as most canning plants are situated near the agricultural areas, in order to be near the necessary foodstuffs, the effluents are generally discharged to local sewage works. Corn packing wastes are the worst encountered, but pea wastes are also highly putrescible. Tomato wastes have so high a suspension of solids that they should be screened first through a 40-mesh screen, the *p*H controlled, and the flow balanced and then clarified with the addition of lime in conjunction with iron salts. Ensilage wastes from the many new farm silos should never be tipped into the rivers; they should be used for irrigating the land. Red beet, tomato and pumpkin cannery wastes should be treated with lime and ferric chloride, mixed, coagulated, and settled by continuous flow or fill-and-draw methods. Ferric chloride is unnecessary if 80 to 90 parts of lime per 100,000 are added to tomato waste treated by the fill-and-draw method, or if 100 parts of lime per 100,000 are added for continuous-flow working. Waste of this sort can also be screened and filtered through sandstone chips, the *p*H being adjusted to 8.0 before filtration, the most acid waste, in the tomato season, requiring 1 lb. of lime per 500 gallons of the waste. The chlorine requirement is generally in the proportion of 2 to 10 parts per million for the tomato season.

Artificial silk works and paper mills also make a heavy contribution to river pollution, much of which is needless. One of the worst polluted rivers is the Mersey, which receives up to 40 million gallons of crude sewage a day in the estuary, which has a total volume of 1,000 million gallons a day. Pollution is worst between Warrington and Widnes, where the concentration of free and saline ammonia, solid organic carbon, and sulphide is highest. The Mersey mud contains sulphate, sulphide and elementary sulphur. The black underwater mud, when exposed, contains ferrous sulphur which, on drying in the air, is converted to elementary sulphur and iron oxide and turns brown; it is reconverted to black sulphide when under water at the next tide.

# New French Potash Deposits

### Concentration in the Fertiliser Industry

FOLLOWING the concentration of the French nitrogenous fertiliser industry in the Groupement de l'Industrie de l'Azote, a new company has been formed under the title Société de Gestion du Groupement de l'Industrie de l'Azote. Of the 620 founders' shares 300 have been taken up by Kuhlmann, 140 by Grande Paroisse, 100 by St. Gobain, and 60 by Produits Azotés. Most of these companies have suffered from lack of raw materials and electric power, and therefore been compelled to curtail their production or deplete their stocks. In recent months several firms in the heavy industries have evolved plans for the erection or extension of by-product and fertiliser plants, and it is hoped that these will help to provide chemical manure for French agriculture. To make up for the loss of the Alsatian potash mines, Mines de Potasse et de Magnésite is sinking a shaft at Boudigot (Landes) in S.W. France, where potash deposits have been discovered. Production is to begin as soon as exploration work has been completed.

# Personal Notes

COLONEL H. S. BRIGGS, O.B.E., M.I.Mech.E., has been nominated by the Board of Trade to be the Government representative on the executive committee of the British Standards Institution.

MR. J. P. C. DANNY, MR. G. H. LAMB, and MR. J. C. SHEATHER have resigned from the board of British Emulsifiers, Ltd., and MR. G. S. JAMES, MR. NATHAN CHINN, and MR. M. M. BERGER have been elected directors.

VISCOUNT GREENWOOD, who is a director of many companies, including Messrs. Dorman Long and Co., Ltd., has been appointed to the Board of the Brazilian Traction, Light and Power Co.

# New Control Orders

## Potassium Salts

THE Minister of Supply, in consultation with the Minister of Agriculture and Fisheries, has made the Control of Fertilisers (No. 18) Order, 1942, which allows the packing of imported potassium salts (or fertilisers containing imported potassium salts) in packages of not less than 14 lb. weight. Hitherto the minimum package has been 1 cwt., but it will be possible to release some potash in the forthcoming season to allotment holders and gardeners, and the object of the new Order is to permit packing for this retail trade. The Order (S.R. & O. 1942, No. 228) came into force on February 13.

## Coal Tar Products

The Coal Tar Naphtha and Xylole Order, 1942 (S.R. and O. 1942, No. 218), made by the Secretary of Mines and coming into force on March 1, controls the acquisition and disposal of coal tar naphtha and xylol in quantity. Excluded from the Order are the disposal or acquisition, at any one time, of quantities of coal tar naphtha not exceeding 100 gallons and of xylol not exceeding 50 gallons, or, in any single quarterly period, of coal tar naphtha not exceeding 200 gallons and of xylol not exceeding 100 gallons. Furthermore the Order does not apply to the importation of the controlled products into the United Kingdom.

No dealings in quantities greater than the above of the controlled products are permitted except under licence; arrangements for blending the products concerned are subject to directions from the Secretary for Mines; and provision is made for prices to be fixed by the Secretary for Mines.

In this Order, "coal tar naphtha" means any liquid derived from coal of which, when tested by the standard method, not more than 5 per cent. shall have distilled when the temperature has reached 125° C. (running point) and not less than 90 per cent. shall have distilled when the temperature has reached 200° C. (stop point), and which consists of at least 80 per cent. of hydrocarbons and which contains not more than the percentage of toluene permitted by the Control of Toluene Order for the time being in force; and "xylole" means any coal tar naphtha of which, when tested by the standard method, not more than 5 per cent. shall have distilled when the temperature has reached 138° C. (running point), and not less than 95 per cent. shall have distilled when the temperature has reached 145° C. (running point).

## Tin Control and Prices

The Minister of Supply has made the Control of Tin (No. 4) Order, 1942, which came into force on February 16, extending the Control of Tin (No. 3) Order, 1941, by which the acquisition of tin was made subject to licence or direction by the Minister. The present Order brings the tin content of alloy scrap containing not less than 12 per cent. of tin and of tinplate clippings and waste within the definition. Persons who acquire not more than one hundredweight of tin in any calendar month, and persons who do not treat, use or consume tin scrap, alloy scrap as abovementioned, tinplate waste, or tin residue, slag, dross or sludge otherwise than by cleaning, crushing or sorting it, are exempted from the licensing provisions regarding these materials (S.R. & O. 1942, No. 101).

In addition to the basis price of £275 per ton for tin delivered buyers' premises, extra prices and charges have now been established by the Non-Ferrous Metal Control, Ministry of Supply, for grades of a purity higher than 99.75 per cent.; for ingots under 28 lb.; for bars and strip; for grain bars and granulated tin; and for small lots under 1 ton (except in the case of grain bars and granulated tin). These new prices apply to all metal sold by the Control since the date of the Control of Tin (No. 3) Order, 1941. All inquiries should be addressed to the Non-Ferrous Metal Control, Grand Hotel, Rugby. (Tel. Rugby 3321).

## Tungsten Alloys

The Control of Iron and Steel (No. 19) Order, 1942, which came into force on February 17, amends the No. 15 Order. The principal purpose of the Order is to conserve available supplies of tungsten alloys by restricting high-speed steel containing tungsten to purposes where its use is essential.

The effect of the Order is: (1) High-speed steel, whatever the tungsten content, can now only be acquired under the authority of a licence issued by the Iron and Steel Control. Hitherto a licence has been necessary only when the tungsten content was 14 per cent. or more.

(2) Existing licences for high-speed steel containing 14 per cent. or more of tungsten will remain in force for steel of such specification until May 1. On and after that date such licences will automatically be valid only for high-speed steel containing up to 6½ per cent. of tungsten.

(3) High-speed steel cannot now be acquired without licence from a stockholding merchant.

(4) The prices of ferro-tungsten, 98-99 per cent. tungsten powder, and high-speed steel bars have been increased.

# Petrol from Oil Shale

## Swedish Subterranean Extraction Method

THE extraction of motor spirit from oil shale by application of electric heat has been the subject of experiments, reportedly successful, in the Närke plant of the Swedish Shale Oil Company. The process, developed by F. Ljungström, provides for the insertion of electric heat elements into some of the drilling holes and heating of the oil shale underground to 400° C. As a result of this, oil vapour rises from other drilling holes and motor spirit is obtained from the vapour by condensation. It is claimed for the new process that it involves no expensive equipment apart from that required for the supply of electricity, and that 75 per cent. of the oil content of the shale can be utilised without bringing the shale to the surface. It is also thought that the output of shale oil can be speedily increased by the new process; motor spirit accounts for 24 per cent. of the oil obtained.

## New Russian Deposits

The Georgian Academy of Science has also elaborated a method of making liquid fuel from shale, of which Transcaucasia has inexhaustible resources, according to Moscow radio. Manganese, also, has been extracted from the deposit, hitherto discarded, which is left over after washing the ore. New methods of prospecting have disclosed fresh oil, coal, and manganese deposits.

The *Allen Engineering Review*, published quarterly by by MESSRS. W. H. ALLEN, SONS, & CO., LTD., Bedford, contains a survey of the application of the Allen internal combustion engines for power requirements in the oil field.

The January issue of *Deco Trefoil*, published by the DENVER EQUIPMENT CO., LTD. (London office, 493a Northolt Road, South Harrow, Middx.), contains, among other items of interest, a full description of the working of the tin plant of the Consolidated Mining and Smelting Company of Canada, Ltd.

# Synthetic Resins in Germany

## Acrylic Acid Esters for Textile Finishing

LACK of natural substances for finishing textiles, such as rubber, gutta-percha, shellac, and linseed oil, has drawn the attention of German chemists to the possibility of replacing them by synthetic materials like cellulose esters and ethers, phenol-urea and formaldehyde-urea condensation, products, and high-molecular polymerisation products, especially polyvinyl compounds and esters of acrylic acid. While normally economic considerations prevent the widespread use of the last material, it is used to a substantial extent for industrial fabrics. As acrylic resins are transparent, without colour or odour, resistant to chemicals (especially to alkalis), and do not absorb more than 2 per cent. of water, they are, if suitably blended, actually better in practice than the natural products which they replace, according to German reports. They are easily applied by ordinary textile machinery either in the form of aqueous dispersions or in solutions with organic solvents, but, since supplies of solvents are limited, the former plan is now usually adopted. Their use is recommended in particular on artificial wool, but they are also employed for stiffening cuffs and collars, possibly in conjunction with starch (to prevent "dusting"), and in colour-printing (as a binder for pigments). Finally, they have been used for waterproofing canvas so as to give it a neat appearance and maintain bright colouring. Fabrics treated with acrylic resins can be safely cleaned with water, soap, and soda.

### Synthetics on View

An exhibition of German synthetic resin and similar construction materials opened recently in Zurich, and the exhibits showed the great progress made by Germany in adapting modern plastics to engineering purposes, with the object of conserving metal supplies for war needs. Among the materials shown were "Cellon," in a wide range of applications, such as the fabrication of gas masks; and "Trolitan," the phenolic resinoid, used in a variety of electrical-insulation applications. "Trolitax," which appeared to be a new material, is a synthetic resin-impregnated paper of high dielectric value, while "Lignofol" was claimed to be an adequate substitute for hard tropical woods. "Pollopas," the well known urea-formaldehyde plastic, is used in the production of mechanical and general small parts, and "Trolit" and "Trolitul," two die-cast synthetics, have found many uses in machine and apparatus construction.

# Chlorite Treatment for Sugars

## Cheap Spraying Method Suggested

THE use of sodium and calcium chlorites for bleaching sugar solutions has been investigated by H. S. Isbell, and a method for treating raw sugar is described in the *Journal of Reseach* of the National Bureau of Standard for December last. Chlorites in neutral and slightly acid solutions exert bleaching action on the coloured impurities in raw sugar. In addition to the bleaching effect, chlorites have marked bactericidal properties, so that treatment of raw sugars and sugar solutions with chlorites inhibits bacterial action. Ordinarily, considerable time elapses between the production of raw sugar and its use at the refinery, and during this period there is loss of sucrose by bacterial action. Since pure sucrose is not altered by contact with chlorites for long periods of time, the chlorite can remain in contact with the sugar crystals in storage and thus act as a preservative. In the industrial application of the process the raw sugar might be merely sprayed in the centrifuge with a solution containing the chlorite; then the small quantity of chlorite solution remaining with the sugar crystals would exert the desired bleaching and preserving effects. The cost of the treatment, which would depend almost entirely on the cost of chlorite, should not be excessive because chlorites are now being produced in commercial quantities for use in the textile and paper industries.

# Chemical Matters in Parliament

## Fuel-Saving Devices

LAST week in the House of Commons Mr. T. Smith asked the Secretary for Mines whether any examination had taken place into the usefulness of so-called fuel-savers offered to the public; and with what results. In reply, Mr. Grenfell said that he assumed that the so-called "fuel savers" mentioned were the chemicals sold for spraying over coal or coke. Several of these preparations were carefully tested on coal fires a number of years ago, on behalf of the Fuel Research Board, and found to have no effect. A similar investigation, made more recently by the U.S. Bureau of Mines, showed that treatment with certain proprietary products made no difference on tests of commercial boilers.

Mr. Smith then asked if Mr. Grenfell was aware that one of these products upon analysis proved to be nothing more than common salt, and whether there were no means of taking action in order to protect the public; to which Mr. Grenfell replied that unless these people could be proved to be committing fraud, he certainly thought that he had no ground for taking action against them.

### Straw in Paper Manufacture

Mr. Naylor asked the Minister of Supply whether further consideration was being given by his Department to the use of straw in the manufacture of paper needed for munitions; and whether he was aware that a considerable increase in production would be obtained if more machinery were made available to the manufacturers. Replying, Mr. Assheton stated that steps were being taken further to extend the use of straw in the manufacture of paper and board.

### Industrial Health Research Board

Mr. Wootton-Davies asked the Financial Secretary to the Treasury what were the present funds available to the Industrial Health Research Board; and whether in view of the importance of industrial health in obtaining maximum war production, he could arrange for an increase in the resources of this board during the war period. Captain Crookshank replied that the Industrial Health Research Board was financed by the Medical Research Council out of the general provision made by the Government for the work of that council, and while he was aware of the importance of the work done by this board, he had no reason to think that it was restricted through lack of funds.

### Manufacture of Synthetic Vitamin B

Sir E. Graham-Little asked the Parliamentary Secretary to the Ministry of Food what was the estimated cost of providing the two new factories for the production of synthetic vitamin B; whether he would give the names and technical qualifications of the persons put in charge of this manufacture; and whether there would be any connection between the management of the new factories and the firm of Roche Products, Limited. Replying, Major Lloyd George stated that the information asked for in the first part of the question was not yet available. Two of the principal firms in the fine chemical industry would be concerned in the management of these factories, but neither had any connection with the company mentioned in the last part of the question.

A 12-page catalogue issued by the LEEDS AND NORTHRUP CO., 4901, Stenton Avenue, Philadelphia, Pa., describes a new microphotometer which mechanically scans spectrographic plates or films and which, by means of an L & N Speedomax recorder, automatically records on a wide strip-chart the relative positions and densities of spectrum lines. Quick determinations of elements present in small percentages are made possible by pen-and-ink records of standard and test spectrograms on one chart. So rapid is the response of the Speedomax recorder to density changes, that in less than 1.5 seconds the pen moves from one position and comes to rest at its new position, even across the entire width of the 9-inch chart.

# General News

**The Camden Chemical Co., Ltd.,** chemical manufacturers, Northington House, Northington Street, London, W.C.1, have been elected members of the American Chamber of Commerce in London.

**Certain workers in non-ferrous metal industries,** coke and by-products and gas, salt, asphalte, and textile works are among those who are to receive supplementary clothing coupons. These will be issued to employers, who must apply to Ministry of Labour local offices before February 28.

**Since our report last week** on the fused alumina cement, "C" quality, manufactured by the Thermal Syndicate, Ltd., Wallsend, we have received news of a factory test on their even more recently developed product, "CC" quality fused alumina cement. This is for use with platinum heating elements, operating up to 1650° C., and the exacting tests made have proved it to be highly satisfactory.

**A Ministry of Supply Order** just issued prohibits dealings in and the use of bristles in brushmaking, except under licence. Exceptions are made for Government and hospital contracts, industrial brushes, paint and paste brushes to a limited extent, certain shaving brushes and tooth brushes, and brushes for licensed export orders. Apart from these a licence to use bristles is needed, but as a general rule one will not at present be granted.

**Wholesale prices in January** for industrial materials and manufactures stood at 158.5, as measured by the Board of Trade index number (1930 = 100). This marks a rise of 0.1 over December, and 6.8 over January, 1941. The figures for chemicals and oils were 130.4 (December, 129.7), for non-ferrous metals 124.4 (124.1), and for iron and steel 181.7 (same). No individual commodities in the three groups mentioned showed a rise of more than ½ per cent., except aspirin (5½ per cent.) and salicylic acid (3 per cent.) in the chemical group.

**The Petroleum Board announces** that owing to increased costs of importing and distribution it has been found necessary to increase the prices for each gallon of petroleum products from February 17, as follows: Motor spirit, 1d. on the retail price, making the ex-pump price of pool motor spirit in the England and Wales and South Scotland zone, 2s. 1½d. The new wholesale price will be 1s. 10d. Diesel oil, for road vehicles, 1½d., other than for road vehicles (inland trade schedule), 1½d.; vaporising oil, 1d.; white spirit, 1½d.; gas oil (inland trade schedule), 1½d.; fuel oil and heavy oil (inland trade schedule), 1½d.

**Facts about Eire's war-time chemical position** are given in a recent article by R. M. Fox in the Manchester Guardian. Carbide, he says, is being produced at Askeaton, Co. Limerick, from lime and Castlecomer coal, a revival of an industry that faded out in 1935 owing to overseas competition. A factory near Dublin is planning to use 120 to 130 tons of wheat-straw a week in the manufacture of paper, producing 80 to 85 tons a week of wrapping paper and strong cardboard. Metal scrap, it is hoped, may be handled at the Haulbowline Steel Mills, Cork, the reopening of which is contemplated, and the country's coal resources, especially anthracite, are to be further exploited.

**The Trading with the Enemy** (Specified Persons) (Amendment) (No. 2) Order, 1942, which came into force on February 11, contains the names of about 600 persons or firms in neutral countries, with whom trading is illegal. A feature of the present list is the large number of Japanese firms operating in South America. The following names are of special chemical interest: S.A. "Montecatini" Sociedad General para la Industria Minera y Quimica, Brasil 71-73, Buenos Aires; Cia. Brasileira de Carbureto de Calcio, Rua 1 de Março, Rio de Janeiro; Distruibuidora Brasileira de Aços e Metaes "Dibraço," Ltda., and Empreza Brasileira de Mineraçao, both of S. Paulo; and Productos Quimicos Fletcher, S.A., Mexico City. In Switzerland the Aluminium Industrie, A.G., of Chippis, and the S.A. pour l'Industrie de l'Aluminium, of Lausanne, have been deleted from the list.

# From Week to Week

## Foreign News

**In Italy** the Azienda Nazionale Idrogenazione Combustibili (ANIC) has built a pilot plant for the manufacture of liquid butane.

**Imports of chemicals, drugs, dyes and colours** into Palestine in the first seven months of 1941 were valued at £(P)359,645 against £(P)310,300 in the corresponding period of 1940.

**Vanadium has been placed** under a complete allocation system in the United States by the Director of Priorities. Approximately half the supply is home-produced, the remainder coming from Peru.

**The Argentine Government** has instructed the Grain Regulating Board to deliver 150,000 tons of linseed from stock to national factories for manufacture into oil. The reason for this decision is the difficulty of finding sufficient export markets for linseed and the need for economising storage and shipping space.

**An eight-foot-thick bauxite** vein has been discovered at Martinsburg, Missouri, 150 miles N.W. of St. Louis; it was struck at a depth of 407 feet. Samples of the ore have been taken to assayers to determine aluminium content. A 60 per cent. assay may lead to the construction of a Government aluminium plant there.

**Stockholms Superfosfatfabrik A.B.** has raised its capital from 12 to 15 million kronor. The new funds are to be used for an increase in power production and the introduction of new manufactures. The cyanamide plant near Stokvik has been extended and now has a capacity of 40,000 tons per annum. The plant for nitrogenous fertilisers at Alby has been reopened.

**A large chemical depot** at Bydgoszcz (Poland) was destroyed by a mysterious explosion and fire a few days ago, according to the Krakauer Zeitung. The journal complains that German "constructive work" in Poland is hampered by arson and other forms of sabotage; the remedy adopted has been to send large batches of Poles to concentration camps, irrespective of whether the authors of the trouble are traced.

**During October, 1941,** the Germans were negotiating with Sweden for the shipment of 20,000 metric tons of sulphate wood pulp, but failed to come to an agreement on the price, which was surprising, as Germany had purchased sulphate pulp from Finland a short time before, at appreciably higher quotations. Shipments of chemical pulp from Sweden to South American countries are meanwhile proceeding according to schedule.

**A new method for making methyl bromide,** developed in Germany, has been patented jointly by H. Petri and I. G. Farben (Ger. P. 703, 835). The process reacts bromine and methyl alcohol in a vaporous state at high temperatures over catalysts such as silica gel, activated carbon, zinc chloride, phosphoric acid, coke, etc. It is claimed that a 95 to 97 per cent. yield is obtained.

# Forthcoming Events

A joint meeting of the **Royal Photographic Society** and the **Institute of Physics** will be held on **February 24** at 16 Princes Gate, S.W.7, when Mr. E. R. Davies will speak on "The Rôle of Photography in the Detection and Measurement of Radiation."

A joint meeting of the **Coke Oven Managers' Association** and the **Institute of Fuel,** together with the **Iron and Steel Institute** and the **Institution of Gas Engineers** will be held at the Royal Victoria Station Hotel, Sheffield, at 2.30 p.m., on **February 25,** when Mr. J. G. Bennett, Director of the British Coal Utilisation Research Association, will present a paper on "The Future of Coke," to be followed by a discussion.

The twenty-third annual general meeting of **The Newcastle Chemical Industry Club** will be held in the Club Rooms, on **February 26,** at 6.30 p.m., after which a paper on "The Utilisation of Vitamin from Natural Sources," will be read by Mr. H. G. C. Carter.

# Weekly Prices of British Chemical Products

PRICE conditions in practically all sections of the industrial chemical market remain steady with a very firm undertone. During the past week the general movement has been good with contract delivery specifications, which have been fairly substantial, commanding chief attention. There is a good call for the majority of the soda products and in a number of directions materials remain in short supply. There is no change in the position of the potash products, offers being quickly absorbed. Acetone is in good request, while there is a brisk demand for formaldehyde. In the acid section both citric and tartaric are firm and scarce, whilst acetic, oxalic and hydrochloric acids are in steady demand. A fair amount of activity has been reported from the coal tar products market during the past week and in most sections a strong tone has been in evidence. The chief interest centres around crude carbolic acid and the creosote oils with xylol and pyridine rather slow markets.

MANCHESTER.—The general movement of textile and other industrial chemicals on the Manchester market during the past week has been made up for the most part of deliveries under contracts, which are being drawn against steadily. There has been a moderate number of inquiries relating to parcels of near delivery positions, but actual business in connection with these is frequently difficult to put through because supplies are not available. Quotations are well held throughout the market. Among the by-products, crude tar, creosote oil, carbolic and cresylic acids, and the majority of the light distillates are being called for steadily. No change in prices.

GLASGOW.—In the Scottish heavy chemical trade during the past week business has been rather limited both for home and export business. Prices still maintain their high level.

### Price Changes

**Rises:** Antimony oxide, benzol, carbolic acid, formaldehyde, hydrofluoric acid, litharge, magnesium chloride, magnesium sulphate, caustic soda, sodium hyposulphite, sodium sulphide.

**Falls:** Aluminium sulphate, antimony sulphide, arsenic, bleaching powder, carbon bisulphide, lead acetate, sodium bisulphite powder, sodium nitrite.

## General Chemicals

**Acetic Acid.**—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

**Acetone.**—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

**Alum.—Loose lump, £10 10s. per ton, d/d, nominal.**

**Aluminium Sulphate.**—£10 5s. per ton d/d.

**Ammonia Anhydrous.**—1s. 9d. to 2s. 3d. per lb.

**Ammonium Carbonate.**—£37 per ton d/d in 5 cwt. casks.

**Ammonium Chloride.**—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

**Antimony Oxide.**—£111 to £117 per ton.

**Arsenic.**—99/100%, £33 10s. per ton, ex store.

**Barium Chloride.**—98/100%, prime white crystals, £11 10s. to £13 per ton, bag packing, ex works; imported material would be dearer.

**Bleaching Powder.**—Spot, 35/37%, £10 17s. 6d. per ton in casks, special terms for contract.

**Borax, Commercial.**—Granulated, £31 10s.; crystals, £32 10s.; powdered, £33; extra fine powder, £34; B.P. crystals, £40 10s.; powdered, £41; extra fine, £42 per ton for ton lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £83; powder, £84 per ton in tin-lined cases for home trade only, packages free, carriage paid.

**Boric Acid.**—Commercial, granulated, £52 15s.; crystals, £53 15s.; powdered, £54 15s.; extra fine powder, £56 15s.; B.P. crystals, £61 15s.; powdered, £62 15s.; extra fine powdered, £64 15s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

**Calcium Bisulphite.**—£6 10s. to £7 10s. per ton f.o.r. London.

**Calcium Chloride.**—70/72% solid, £5 15s. per ton ex store.

**Charcoal Lump.**—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

**Chlorine, Liquid.**—£22 7s. 6d. per ton, d/d in 16/17 cwt. drums (3-drum lots); 5½d. per lb. d/d station in single 70-lb. cylinders.

**Chrometan.**—Crystals, 5½d. per lb.; liquor, £24 10s. per ton d/d station in drums.

**Chromic Acid.**—1s. 3d. per lb., less 2½%, d/d U.K.

**Citric Acid.**—1s. 5½d. per lb., normal; imported material, 1s. 10d. per lb. MANCHESTER: 1s. 8d. per lb.

**Copper Oxide.**—Black, £95 per ton.

**Copper Sulphate.**—About £30 10s. per ton f.o.b. MANCHESTER: £30 10s., less 2%, in 5 cwt. casks f.o.b. Liverpool.

**Cream of Tartar.**—100%, £17 2s. per cwt., less 2½%, d/d in sellers' returnable casks.

**Formaldehyde.**—£24 5s. £25 10s. per ton d/d. MANCHESTER: 40%, £23 to £26 per ton in casks d/d; imported material dearer.

**Formic Acid.**—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

**Glycerine.—Chemically pure, double distilled 1260 s.g., in tins,** £4 to £5 per cwt., according to quantity; in drums, £3 12s. 6d. to £4 6s. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

**Hexamine.**—Technical grade for commercial purposes, about 1s. 4d per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

**Hydrochloric Acid.**—Spot, 6s. 3½d. to 8s. 9½d. carboy d/d, according to purity, strength and locality.

**Hydrofluoric Acid.**—59/60%, about 1s. to 1s. 2d. per lb.

**Iodine.—Resublimed B.P., 9s. 11d. to 13s. 11d. per lb., according to quantity.**

**Lactic Acid.**—Dark tech., 50% by vol., £40 10s. per ton. Not less than one ton lots ex works; barrels returnable, carriage paid.

**Lead Acetate.**—White, £50 ton lots. MANCHESTER: £48 to £50 per ton.

**Lead Nitrate.—About £46 10s. per ton d/d in casks.**

**Lead, Red.**—English, 5/10 cwt., £47 10s.; 1 cwt. to 1 ton, £47 5s.; 1/2 tons, £47; 2/5 tons, £46 10s.; 5/20 tons, £46; 20/100 tons, £45 10s.; over 100 tons, £45 per ton, less 2½ per cent., carriage paid; non-setting red lead 10s. per ton dearer in each case.

**Lead, White.**—Dry English, less than 5 tons, £55; 5/15 tons, £51; 15/25 tons, £50 10s.; 25/50 tons, £50; 50/200 tons, £49 10s. per ton, less 5 per cent., carriage paid; Continental material, £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £66 10s.; 5/10 cwt., £65 10s.; 10 cwt. to 1 ton, £65; 1/2 tons, £63 10s.; 2/5 tons, £62 10s.; 5/10 tons, £60 10s.; 10/15 tons, £59 10s.; 15/25 tons, £59; 25/50 tons, £58 10s.; 50/100 tons, £58 per ton, less 5 per cent., carriage paid.

**Litharge.**—1 to 2 tons, £44 per ton.

**Lithium Carbonate.—7s. 9d. per lb. net.**

**Magnesite.**—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

**Magnesium Chloride.**—Solid (ex wharf), £12 to £16 per ton. MANCHESTER: £14 to £15 per ton.

**Magnesium Sulphate.**—Commercial, £12 to £14 per ton, according to quality, ex works.

**Mercury Products.**—Controlled price for 1 cwt. quantities: Bichloride powder, 11s. 7d.; bichloride lump, 12s. 2d.; ammon. chloride powder, 13s. 5d.; ammon. chloride lump, 14s.; mercurous chloride, 13s. 9d.; mercury oxide, red cryst., B.P., 15s.; red levig. B.P., 15s. 6d.; yellow levig. B.P., 14s. 9d.; yellow red, 14s. 4d.; sulphide, red, 12s. 11d.

**Methylated Spirit.**—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

**Nitric Acid.**—£24 to £26 per ton, ex works.

**Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in** 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

**Paraffin Wax.**—Nominal.

**Potash, Caustic.**—Basic price for 50-100 ton lots. Solid, 88/92%, commercial grade, £55 7s. 6d. per ton, c.i.f. U.K. port, duty paid. Broken, £5 extra; flake, £7 10s. extra; powder, £10 extra per ton. Ex store, £3 10s. supplement.

**Potassium Bichromate.**—Crystals and granular, 7½d. per lb.; ground, 8½d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.
**Potassium Carbonate.**—Basic prices for 50 to 100 ton lots; **calcined, 98/100%, £58 per ton, c.i.f. U.K. port. Ex warehouse, £3 10s. extra per ton.**
**Potassium Chlorate.**—Imported powder and crystals, ex store London, 2s. per lb., nominal.
**Potassium Iodide.**—B.P., 8s. 8d. to 12s. per lb., according to quantity.
**Potassium Nitrate.**—Small granular crystals, £40 to £45 per ton ex store, according to quantity.
**Potassium Permanganate.**—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.; technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.
**Potassium Prussiate.—Supplies scarce, prices nominal.**
**Salammoniac.**—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.
**Soda, Caustic.**—Solid 76/77%; spot, £16 7s. 6d. per ton d/d station.
**Sodium Acetate.**—£40 per ton, ex wharf.
**Sodium Bicarbonate (refined).**—Spot, £11 per ton, in bags.
**Sodium Bichromate.—Crystals, cake and powder, 5½d. per lb.,** anhydrous, 6d. per lb., net d/d U.K.
**Sodium Bisulphite Powder.**—60/62%, £17 10s. per ton d/d in 2-ton lots for home trade.
**Sodium Carbonate Monohydrate.**—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.
**Sodium Chlorate.**—£36 to £45 per ton, d/d, according to quantity.
**Sodium Hyposulphite.**—Pea crystals, £20 per ton for 2-ton lots; commercial £14 15s. per ton. MANCHESTER: Commercial, £14 10s.; photographic, £21 5s.
**Sodium Iodide.**—B.P., for not less than 28 lb., 9s. 6d. per lb.; for not less than 7 lb., 13s. 1d. per lb.
**Sodium Metasilicate.**—£16 per ton, d/d U.K. in 1-ton lots.
**Sodium Nitrate.**—Refined, £15 5s. per ton for 6-ton lots d/d.
**Sodium Nitrite.**—£21 to £23 per ton for ton lots.
**Sodium Percarbonate.**—21½% available oyxgen, £7 per cwt.
**Sodium Phosphate.**—Di-sodium, £23 to £25 per ton d/d for ton lots. Tri-sodium, £25 to £30 per ton d/d for ton lots.
**Sodium Prussiate.**—7½d. to 8½d. per lb. ex store.
**Sodium Silicate.**—£6 to £10 per ton, for 4-ton lots.
**Sodium Sulphate (Glauber Salts).**—£4 10s. ton d/d.
**Sodium Sulphate (Salt Cake).**—Unground. Spot £4 8s. 6d. per ton d/d station in bulk. MANCHESTER: £4 13s. 6d. per ton d/d station.
**Sodium Sulphide.**—Solid 60/62%. Spot, £17 15s. per ton d/d in drums; crystals, 30/32%, £12 7s. 6d. per ton d/d in casks.
**Sodium Sulphite.**—Anhydrous, £29 10s. per ton; Pea crystals, spot, £19 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.
**Sulphur.**—Finely powdered, £17 10s. to £19 per ton d/d; precip. B.P., 68s. per cwt.
**Sulphuric Acid.—168° Tw., £6 10s. to £7 10s. per ton;** 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.
**Tartaric Acid.**—4s. 3½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 4s. 3½d. to 4s. 4d. per lb.
**Tin Oxide.**—Snow white, £14 5s. to £14 15s. per cwt.
**Zinc Oxide.**—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d.
**Zinc Sulphate.**—Tech., £20-£21 per ton, carriage paid, casks free.

## Rubber Chemicals

**Antimony Sulphide.**—Golden, 1s. 2d. to 2s. 2d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.
**Arsenic Sulphide.**—Yellow, 1s. 10d. to 2s. per lb.
**Barytes.**—Best white bleached, £8 3s. 6d. per ton.
**Cadmium Sulphide.**—6s. to 6s. 6d. per lb.
**Carbon Black.**—5¼d. to 7½d. per lb., according to packing.
**Carbon Bisulphide.**—From £31 per ton, according to quantity, in free returnable drums.
**Carbon Tetrachloride.**—£46 to £49 per ton.
**Chromium Oxide.**—Green, 1s. 6d. per lb.
**India-rubber Substitutes.**—White, 6½d. to 9½d. per lb.; dark, 6d. to 6½d. per lb.
**Lithopone.**—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.
**Mineral Black.**—£7 10s. to £10 per ton.
**Mineral Rubber, "Rupron."**—£20 per ton.
**Sulphur Chloride.**—7d. per lb.
**Vegetable Lamp Black.**—£48 per ton.
**Vermilion.**—Pale or deep, 13s. 8d. per lb. for 30 lb. lots.

Plus 5% War Charge.

## Nitrogen Fertilisers

**Ammonium Phosphate Fertilisers.—Type B, £13 18s. 9d.** per ton in 6-ton lots, d/d farmer's nearest station in February.
**Ammonium Sulphate.**—Per ton in 6-ton lots, d/d farmer's nearest station: February, £10 0s. 6d.; March/June, £10 2s.
**Calcium Cyanamide.**—Nominal; **supplies very scanty.**
**Concentrated Complete Fertilisers.**—£14 8s. 9d. per ton in 6-ton lots d/d farmer's nearest station in February. Supplies small except C.C.F. Special.
**"Nitro Chalk."**—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station in February.
**Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £15 5s. per ton; granulated, over 98%, £14 10s. per ton. Surcharges for smaller quantities unless collected at warehouse or depots.**

## Coal Tar Products

**Benzol.**—Industrial (containing less than 2% of toluol), 2s. 4d. per gal., ex works.
**Carbolic Acid.**—Crystals, 9½d. to 11½d. per lb.; Crude, 60's 3s. 9d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11½d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.
**Creosote.**—Home trade, 6½d. to 9d. per gal., f.o.r., maker's works; exports 6d. to 6½d. per gal., according to grade. **MANCHESTER: 6½d. to 9d. per gal.**
**Cresylic Acid.**—Pale, 99/100%, 5s. 6d. per gal. MANCHESTER: Pale, 99/100%, 5s. 4d. per gal.
**Naphtha.—Solvent, 90/160°, 2s. 6d. to 2s. 10d. per gal.; Heavy** 90/190°, 1s. 10½d., naked at works. MANCHESTER: 90/160°, 2s. 5d. to 2s. 10d.
**Naphthalene.**—Crude, whizzed or hot pressed, £11 3s. to £11 8s. per ton; purified crystals, £19 to £36 per ton in 2-cwt. bags; flaked, £28 to £35 per ton. Fire-lighter quality, £7 10s. to £9 10s. per ton ex works. MANCHESTER: Refined, £19 to £38 per ton.
**Pitch.**—Medium, soft, nominal, f.o.b. MANCHESTER: Nominal.
**Pyridine.—90/140°, 18s. per gal.; 90/160°, 14s.; MANCHESTER: 14s. to 18s. 6d. per gal.**
**Toluol.**—Pure, 2s. 5d. nominal; 90's, 1s. 10d. per gal. MANCHESTER: **Pure, 2s. 5d. per gal. naked.**
**Xylol.**—Commercial, 3s. 4d. per gal.; pure, 3s. 6d. MANCHESTER: 3s. 1d. to 3s. 6d. per gal.

## Wood Distillation Products

**Calcium Acetate.**—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £25 to £26 per ton.
**Methyl Acetone.**—40.50%, £54 per ton.
**Wood Creosote.**—Unrefined, about 2s. per gal., according to boiling range.
**Wood Naphtha, Miscible.**—4s. 6d. to 5s. per gal.; solvent, 5s. per gal.
**Wood Tar.**—£4 to £5 per ton, according to quality.

## Intermediates and Dyes (Prices Nominal)

*m*-**Cresol** 98/100%.—Nominal.
*o*-**Cresol** 30/31° C.—Nominal.
*p*-**Cresol** 34/35° C.—Nominal.
**Dichloraniline.**—2s. 8½d. per lb.
**Dinitrobenzene.**—8½d. per lb.
**Dinitrotoluene.**—48/50° C., 9½d. per lb.; 66/68° C., 1s.
*p*-**Nitraniline.**—2s. 5d. per lb.
**Nitrobenzene.**—Spot, 5½d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.
**Nitronaphthalene.**—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.
*o*-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.
*p*-**Toluidine.**—2s. 2d. per lb., in casks.
*m*-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

## Latest Oil Prices

LONDON.—February 18.—For the period ending March 7, per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies:—LINSEED OIL, raw, £41 10s. RAPESEED OIL, crude, £46 5s. COTTONSEED OIL, crude, £31 2s. 6d.; washed, £34 5s.; refined edible, £35 12s. 6d.; refined deodorised, £36 10s. SOYA BEAN OIL, crude, £33; refined deodorised, £37. COCONUT OIL, crude, £28 2s. 6d.; refined deodorised, £31 7s. 6d. PALM KERNEL OIL, crude, £27 10s.; refined deodorised, £30 15s. PALM OIL, refined deodorised, £37; refined hardened deodorised, £41. GROUNDNUT OIL, crude, £35 10s.; refined deodorised, £40. WHALE OIL, crude hardened, 42 deg., £30 10s.; refined hardened, 42 deg., £33. ACID OILS.—Groundnut, £19; soya, £17; coconut and palm kernel, £22 10s. ROSIN, 26s. 6d. to 33s. per cwt., ex wharf, according to grade. TURPENTINE, American, 90s. per cwt., in drums or barrels, as imported (controlled price).

# Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

## Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

J. W. BLAND AND CO. (MORECAMBE), LTD., oil, paint and varnish manufacturers. (M., 21/2/42.) January 26, mortgage to Martins Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Beechwood, Balmoral Road, Morecambe, and plant, machinery, etc. *—. February 11, 1939.

BRITISH VEHICLE PRODUCER GAS, LTD., London, S.W. (M., 21/2/42.) January 21, £1000 debenture to Mrs. M. Beever, London; general charge. *Nil. October 28, 1940.

## Satisfactions

BRITISH CELANESE, LTD., Torquay. (M.S., 21/2/42.) Satisfaction, January 23, of debenture stock registered August 24, 1922, and July 6, 1923, to the extent of £98,438 (balance outstanding), and of debenture stock registered June 21, 1934, to the extent of £53,103.

WILLIAM TOLSON, LTD., Fazeley, bleachers and dyers. (M.S., 21/2/42.) Satisfaction, January 29, £6000, registered January 14, 1921.

# Company News

**Reckitt and Sons, Ltd.**, have declared a quarterly dividend of 5 per cent. (same).

**Super Oil Seals and Gaskets, Ltd.**, report trading profit for 1941 of £133,155 (£87,188).

**Doulton and Co., Ltd.**, report net profit for the year of £35,768 (£31,424), and have declared a dividend of 5 per cent. (same).

**British Industrial Plastics, Ltd.**, report net profit for the year ended September 30 of £15,989 (£24,398), and have declared a dividend of 6 per cent. less tax, on the ordinary shares.

**The Standard Chemical Company, Ltd.**, reports net profit for year to March 31, after depreciation and taxes, of $54,921 ($57,330), and are paying dividends of $1.25 per share (same).

# New Companies Registered

**C. J. Taylor Chemicals (Carlisle), Ltd.** (372,330)—Private company. Capital: £2000 in 1000 5 per cent. preference and 1000 ordinary shares of £1 each. Manufacturing chemists, druggists, drysalters, oil and colour men, importers, manufacturers of, and dealers in oils, polishes, paints, etc. Directors: C. J. Taylor; Anne Swinney. Registered office: 2 Chatsworth Square, Carlisle.

# Chemical and Allied Stocks and Shares

STOCK Exchange markets have continued to be dominated by the war news, and at the time of writing security values have shown a further widespread reaction. This was attributed mainly to the very small demand experienced, because, although more pronounced than a week ago, selling had not been heavy. Apart from shares of companies with important interests in the Far East, such as "Shell" and Burmah Oil, the reaction in values has been moderate. In fact, at the time of writing, the undertone of markets is tending to show improvement, having been assisted to some extent by the Prime Minister's latest speech. The absence of any heavy selling has continued to create a good impression, because it indicates general willingness to be prepared to take a long view and confidence in the future. The satisfactory undertone maintained in British Funds also assisted market sentiment.

Imperial Chemical provided one of the steadiest features among leading industrial securities, and are 32s. 6d. at the time of writing, which compares with 32s. 7½d. a week ago. Moreover, I.C.I. 7 per cent. preference were maintained at 34s. 10½d. Awaiting the results, Borax Consolidated deferred have moved back moderately from 30s. to 29s. 3d. at the time of writing. On further consideration of soap rationing, Lever & Unilever developed a reactionary tendency, and were 28s., compared with 29s. a week ago; the company's various classes of preference shares were virtually unchanged. Associated Cement moved lower to 48s. 9d.; the results fall to be issued next month. There was rather less activity in British Plaster Board 5s. ordinary shares, which were 21s. compared with 21s. 9d. a week ago.

Pending the dividend announcements, due in a few weeks, British Oxygen have moved back from 67s. 6d. to 66s. 3d., and British Aluminium from 45s. to 44s. 9d., but, as in many other directions, the main influence this week has been the surrounding tendency of markets. Turner & Newall have moved back from 71s. 3d. to 68s. 1½d. at the time of writing, and United Molasses from 32s. to 30s. 3d. On the other hand, the units of the Distillers Co., have improved from 74s. to 74s. 9d., and Murex were better on the week at 93s. 1½d. Elsewhere, Wall Paper Manufacturers deferred units reacted from 26s. 7½d to 25s. Among preference shares, Monsanto Chemicals 5½ per cents. were again 22s. 6d., while Morgan Crucible 5½ per cents. were 25s. 7½d. and the 5 per cents. 22s. 6d. United Glass Bottle ordinary remained firmly held and were quoted at 55s., awaiting the results due next month, which are generally expected to show that profits are being dealt with conservatively and the distribution again limited limited to 12 per cent. Triplex Glass 10s. ordinary were lower at 31s. 3d.

At one time there were a fair number of dealings reported in B. Laporte at 64s. 3d., while Fison Packard held their recent improvement, and were quoted at 39s. 4½d. "middle." In other directions, British Match eased from 35s. 6d. to 35s. 1½d., and British Glues & Chemicals 4s. shares were quoted at 6s. 3d. British Drug Houses remained firmly held, and were 25s. "middle," while Greeff-Chemicals Holdings 5s. ordinary were around 5s. 6d. As in many other directions, however, owing to inactive Stock Exchange markets, it is doubtful whether quotations have been tested adequately by business this week. Movements in iron and steel issues were slightly lower; United Steel were 22s. 4½d., Tube Investments 85s. and Stewarts & Lloyds 45s. 10½d. Small declines also ruled in textile issues, including Courtaulds, whose results are due in a few weeks. Shares of companies with retail interests were again reactionary, and Boots Drug were 32s. Southalls (Birmingham) 5s. ordinary were quoted at 25s., following publication of the results showing lower profits and the maintenance of the dividend at 17½ per cent. The latter is conservative and again permits a good proportion of the profits to be placed to reserves, etc. Among oil shares, "Shell" have been marked down to 38s. 9d. and Burmah Oil to 39s.

## OXIDATION-REDUCTION BALANCE

A copy has reached us of the third edition of *The Colorimetric Determination of Oxidation-Reduction Balance*, a useful technical publication of THE BRITISH DRUG HOUSES, LTD., Graham Street, City Road, London, N.1. The new edition of this 22-page booklet has been completely revised so as to bring it into line with current knowledge and practice. A résumé of the theory of oxidation-reduction balance is followed by a discussion of the use of indicators, and of the considerations affecting their use in soil chemistry, estimation of ascorbic acid, milk testing, and other branches of scientific activity. Practical information is given concerning indicators for use in volumetric analyses.

A complete list of the well-known standardised B.D.H. oxidation-reduction indicators is included, and the publishers will be pleased to supply the brochure without charge to any reader on request.

In present circumstances the task before the compilers of a biographical dictionary like *Who's Who*, the 1942 edition of which has just reached us, must indeed be immense. Changes in occupation and address are the very stuff of wartime life, and those eminent enough to appear within the pages of this classic work of reference are by their very importance likely to find themselves in need of corrected entries. The volume for this year fully maintains the standard of production and accuracy for which its predecessors have been noted. It is indispensable in its field. The publishers are Adam and Charles Black, London, and the price in buckram binding is 70s.

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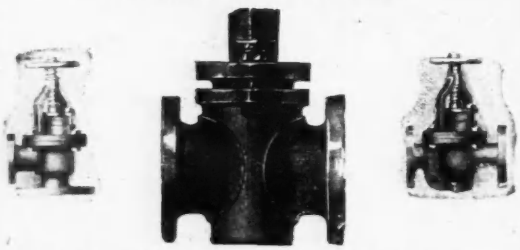
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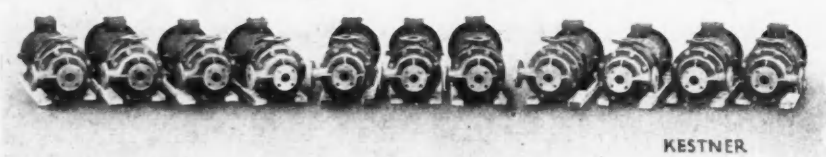
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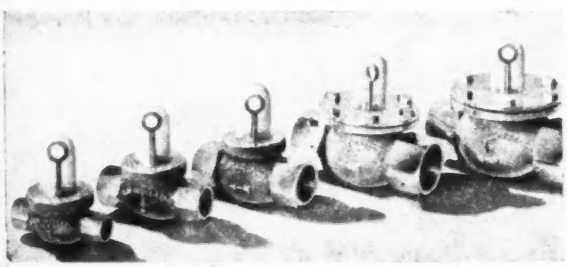

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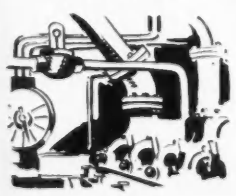

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